



CH2MHILL

July 18, 2005

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Mr. Gary Riley
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: Interim Remedial Action Work Plan for Underground Storage Tank Site 742 in Investigation Area C2, Lennar Mare Island, Vallejo, California

Dear Mr. Riley:

In accordance with Task C.8 "Interim Remedial Action Work Plan for Petroleum Pollution" of the California Regional Water Quality Control Board (Water Board), San Francisco Bay Region Order No. R2-2002-0105, CH2M HILL is submitting this Interim Remedial Action Work Plan (IRA Work Plan) for underground storage tank (UST) Site 742, located in Investigation Area (IA) C2 on Mare Island. An interim remedial action will be performed at UST Site 742, as necessary, to obtain regulatory closure in accordance with the Water Board Order. This IRA Work Plan provides the procedures for implementing the remedial action at UST Site 742.

Site Description

UST Site 742 is located southeast of Building 742 and is distinguished by a circular area of patched asphalt. Historical maps dating from 1919 to 1942 depict an oil tank located 100 feet north of former Building 290 (SSPORTS 1999). The location of this oil tank corresponds with the location of the patched asphalt. Former fuel-oil pipeline (FOPL) segment D1/4/290E was located along the eastern edge of the UST 742 location. UST 742 has not been located during previous investigations conducted at the site, and the tank is believed to have been removed by the Navy.

The site is located on artificial fill material, which consists of clay, silt, sand, gravel, and debris in varying proportions and thickness. The local groundwater flow at this site is primarily east towards Mare Island Strait. Depth to groundwater is estimated to be approximately 4 to 6 feet below ground surface (bgs). Site features are shown on Figure 1. The proposed future land use of the site is industrial.

Previous Investigations

In 1991, the Navy conducted fieldwork at UST Site 742 consisting of a geophysical survey using ground-penetrating radar and exploration using a non-sparking probe rod (PRC 1991). The ground-penetrating radar investigation indicated a possible UST. The exploratory probe rod was advanced into the soil at three locations. Where the geophysical anomaly was detected, the probe rod was extended to 11 feet bgs without hindrance

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(PRC 1991). In one of the three probe-hole locations, a 4-inch concrete pad was encountered at 18 inches bgs (PRC 1991). Below the concrete pad, approximately 4 inches of wood were encountered (PRC 1991). As the probes were removed from the holes, they were covered with a "thick oily-sand mixture" (PRC 1991). The oily substance was assumed to be diesel fuel (PRC 1991). The UST was not located during this investigation.

In 1994, the Navy conducted a follow-up investigation at the site (PRC 1994). Four probe holes were advanced to 10 feet bgs within the circular area near the locations where the 1991 probes were advanced. However, the exact locations are unknown. Wood was encountered in two of the locations at approximately 18 inches bgs. The oily-sand mixture observed during the 1991 investigation was not encountered (PRC 1994). Bay mud was encountered in three of the borings from approximately 4 feet bgs to the bottom of the boring (10 feet bgs). No soil samples were collected from these soil borings.

In 1995, during a FOPL investigation, a boring (0210GB305) was installed immediately downgradient of the raised circular area (PRC 1995). Separate-phase petroleum-type material was observed on the outside of the soil sampler at this boring (PRC 1995). Soil samples collected from the boring were analyzed for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and polychlorinated biphenyls (PCBs). TPH-diesel (reported as unknown diesel-range) was detected at 1,000 milligrams per kilogram (mg/kg), TPH-motor-oil (reported as unknown motor oil-range) at 270 mg/kg, and total recoverable petroleum hydrocarbons at 3,500 mg/kg. VOCs and PCBs were not detected at concentrations greater than laboratory reporting limits. Low concentrations of phenol (0.57 mg/kg) were detected, but no other SVOCs were detected at concentrations greater than laboratory reporting limits. Metals were not detected at concentrations above the ambient values for artificial fill material at Mare Island.

In February 2005, CH2M HILL installed three borings to collect soil and groundwater samples at the site. The sampling was conducted in accordance with the *Draft Site Characterization Report/Interim Removal Action Summary Report, IA C2 UST Sites* (CH2M HILL 2004), submitted to the regulatory agencies on December 20, 2004. Two borings (UST742GB0100 and UST742GB0101) were advanced on February 1, 2005, in the circular area where former UST 742 was located (Figure 1). These borings were advanced in the location where the 1991 investigation had encountered an oily-sand mixture. Soil samples were collected at 5 and 10 feet bgs from these two borings and analyzed for TPH-gasoline; TPH-diesel; TPH-motor-oil; benzene, toluene, ethylbenzene, and xylenes (BTEX); methyl tert butyl ether (MTBE); VOCs; polynuclear aromatic hydrocarbons (PAHs); and PCBs. One boring (UST742GB0102) was advanced on February 5, 2005, downgradient of the circular area, and a grab groundwater sample was collected and analyzed for TPH-gasoline, TPH-diesel, TPH-motor-oil, BTEX, MTBE, VOCs, SVOCs, PAHs, and PCBs.

Boring logs and analytical results are included in Attachment A, located at the end of this IRA Work Plan. TPH odors were observed during drilling in borings UST742GB0100 and UST742GB0101 from approximately 5 to 10 feet bgs, but the oily-sand mixture observed during the 1991 investigation was not encountered. In soil, TPH-diesel (up to 8,600 mg/kg),

TPH-motor-oil (up to 9,400 mg/kg), and benzo(a)pyrene (2.2 mg/kg) were detected from boring UST742GB0100 at concentrations exceeding the Tier 2 cleanup goals. Cleanup goals for UST sites in IA C2 are defined in the *Site Characterization Report/Interim Remedial Action Summary Report, Investigation Area C2 UST Sites* (CH2M HILL 2004) and are summarized in Table 1. Other PAHs and TPH-gasoline were not detected at concentrations exceeding the cleanup goals. BTEX, MTBE, and PCBs were not detected at concentrations greater than laboratory reporting limits. VOCs were not detected in soil at concentrations exceeding reporting limits, except for low concentrations of acetone (0.017 mg/kg and 0.022 mg/kg) in two of the four soil samples. The acetone concentrations are below the Tier 1 environmental screening level (0.5 mg/kg). In groundwater, TPH-diesel (18,000 micrograms per liter [$\mu\text{g/L}$]), TPH-motor-oil (7,500 $\mu\text{g/L}$), xylenes (0.74 $\mu\text{g/L}$), and anthracene (0.2 $\mu\text{g/L}$) were detected. TPH-gasoline, MTBE, PCBs, VOCs, and SVOCs were not detected at concentrations greater than reporting limits. Except for xylenes and anthracene, detected at concentrations well below the Tier 1 environmental screening levels, no other BTEX or PAHs were detected in groundwater at concentrations greater than reporting limits.

Proposed IRA Activities

An interim remedial action will be conducted at UST Site 742 to remove soil containing elevated concentrations of TPH and PAH. The proposed excavation area is shown on Figure 1. The TPH- and PAH-contaminated soil in the vicinity of the circular area will be removed to approximately 10 feet bgs, for a total excavation volume of approximately 750 cubic yards (assuming the excavation has a planar area of 45 feet by 45 feet and a depth of 10 feet).

Approximately 10 confirmation samples will be collected (two samples to be collected from each excavation sidewall at 5 feet bgs, and two samples to be collected from the excavation bottom). Soil samples will be analyzed for TPH-diesel, TPH-motor-oil, and PAHs. Analytical results from the confirmation samples will be evaluated to determine if confirmation sample concentrations are greater than the cleanup goals. If that is the case, further excavation and additional confirmation samples may be necessary.

TABLE 1

Cleanup Goals for UST sites in IA C2

Interim Remedial Action Work Plan for Underground Storage Tank Site 742, Lennar Mare Island, Vallejo, California

	Soil 0 to 10 feet bgs (mg/kg)	Groundwater ($\mu\text{g/L}$)
TPH (middle distillates)	4,172	5,000
TPH (residual fuels)	5,000	5,000
Acenaphthene	2,500	4,200
Acenaphthylene	1,695	4,000
Anthracene	172	44
Benzo(a)anthracene	13	10
Benzo(a)pyrene	1.3	3.8

TABLE 1

Cleanup Goals for UST sites in IA C2

Interim Remedial Action Work Plan for Underground Storage Tank Site 742, Lennar Mare Island, Vallejo, California

	Soil 0 to 10 feet bgs (mg/kg)	Groundwater (µg/L)
Benzo(b)fluoranthene	13	14
Benzo(g,h,i)perylene	69	0.26
Benzo(k)fluoranthene	13	0.8
Chrysene	106	1.6
Dibenzo(a,h)anthracene	3.8	0.5
Fluoranthene	1,640	260
Fluorene	2,500	1,900
Indeno(1,2,3-c,d)pyrene	13	0.54
Naphthalene	38	32,000
Pyrene	2,370	136

If free-phase hydrocarbon is encountered during the removal action, it will be pumped from the excavation, contained, and disposed of properly. The procedures will be consistent with the field procedures identified in Section 3.0 of the *Final Interim Removal Action Work Plan for Industrial Wastewater Pump Stations 1, 12, 6, IR01, IR19, Building 461, and Building 690* (CH2M HILL 2003).

One well (UST742MW0100) will be installed approximately 10 feet downgradient (east) of the removal action area (shown on Figure 1), and groundwater will be sampled on a regular schedule and analyzed for TPH-diesel, TPH-motor-oil, and PAHs.

After the removal action is complete at UST 742, an implementation report will be prepared summarizing the action and presenting the soil confirmation sample analytical data and the groundwater data.

This IRA Work Plan is consistent with the *Final Soil and Groundwater Management Plan* (CH2M HILL 2001), and the *Site Control Plan* (CH2M HILL 2002). The *Soil and Groundwater Management Plan* identifies the procedures that must be followed to ensure that soil disturbance activities are conducted in a manner that is protective of human health and the environment. The *Site Control Plan* identifies measures to prevent unauthorized persons from entering portions of the Lennar Mare Island site where such entry could pose a threat to themselves or others, or where such entry could interfere with the investigation or remediation activities at the Lennar Mare Island site.

This IRA Work Plan will be implemented consistent with the field procedures identified in Section 3.0 of the *Final Interim Removal Action Work Plan for Industrial Wastewater Pump Stations 1, 12, 6, IR01, IR19, Building 461, and Building 690* (CH2M HILL 2003). This previous work plan identifies the requirements for site security and access, traffic controls, permits and notifications, subsurface utility surveys, health and safety, and nuisance monitoring. It

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also provides guidelines for soil stockpile management, backfill and compaction, wastewater storage, stormwater management, site restoration, and waste transportation and disposal.

References

- CH2M HILL. 2001. *Final Soil and Groundwater Management Plan*. November.
- _____. 2002. *Site Control Plan*. January.
- _____. 2003. *Final Interim Removal Action Work Plan for Industrial Wastewater Pump Stations 1, 12, 6, IR01, IR19, Building 461, and Building 690*. June.
- _____. 2004. *Site Characterization Report/Interim Remedial Action Summary Report, Investigation Area C2 UST Sites*. December 20.
- PRC Environmental Management, Inc. (PRC). 1991. *Underground Storage Tank Investigation, Summary Report, Mare Island Naval Shipyard*. October 9.
- _____. 1994. *Site Investigations at Buildings 505, 637/811, 633/635A/635B/635C/647, 742 and 796 Final Field Work Plan*. June 13.
- _____. 1995. *Preliminary Assessment/Site Inspection Report, Final Summary Report, NonRadiological Sites*. May 19.
- Supervisor of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia, Environmental Detachment. (SSPORTS) 1999. *Site Investigation Report for Suspect Underground Storage Tanks, Mare Island Naval Complex, Part III of III*. January 15.

If you have any questions regarding this document, please contact me at 510/587-7539.

Sincerely,

CH2M HILL

Tom Court

for

Jeffery C. Morris, PE

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